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SECOND HAND TECHNOSTRESS AND ITS DETERMINANTS IN THE CONTEXT OF MOBILE DEVICE INTERRUPTIONS IN WORK MEETINGS

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Abstract

Technostress is defined as the stress derived from the use of Information and Communication Technologies (ICTs). Information Systems researchers have studied this phenomenon in the work environment, concentrating mainly on the negative consequences of technostress on the individual that is overwhelmed by the use of ICTs at her or his job. Given the pervasiveness of mobile devices, using them distractively while carrying out other tasks can impact not only the individual using the device (technostress), but also those around her or him. Thus, the distractive use of ICT while performing other tasks can create stress in individuals around ICT users, a term we coin as "second hand technostress". This research in progress paper proposes a theoretical model to examine the potential antecedents of second hand technostress in the context of work meetings. Those antecedents are grouped in factors pertaining to the individual experiencing the second hand technostress, the mobile device user, the organization, the meeting, and the nature of the mobile interruption. A qualitative and a quantitative study are proposed to refine and empirically validate the proposed theoretical model.

Keywords: technostress, second hand technostress, mobile devices, interruptions, work meetings

1 Introduction

Wireless devices, such as mobile phones, are ubiquitous and pervasive. In 2012, there was an estimated 91 mobile subscriptions per 100 inhabitants around the world (International Telecommunications Union, 2013). Mobile devices have three salient characteristics that differentiate them from other Information and Communication Technologies (ICTs): mobility, ubiquity, and personalization (Jarvenpaa, Lang, & Tuunainen, 2005). These three characteristics offer users flexibility and convenience to perform tasks anytime and anywhere. With the use of mobile devices, workers have increased their ability to communicate and share information with colleagues in real time, while at the same time having the capability to engage in different family and social matters seamlessly (Yoo, 2010). However, the intensive usage of mobile devices has also brought negative consequences for users. The high usage of both computers and mobile devices may lead young adults to experience prolonged stress and symptoms of depression (Thomée, Eklöf, Gustafsson, Nilsson, & Hagberg, 2007). The stress derived from the use of ICTs, such as mobile devices, has been referred to as technostress (Ragu-Nathan, Tarafdar, & Ragu-Nathan, 2008).

Qualitative studies have shown that the potential negative consequences of the intensive use of mobile devices are not limited to the user. There are concerns around the usage of devices in social settings; for example, spouses resent the infringement of mobile devices on family activities (Mazmanian, Orlikowski, & Yates, 2005). In the work environment, and in particular during business meetings, the engagement with mobile devices where "individuals stop interacting with someone they are with in person in order to interact with someone on the other end of a mobile phone" (Middleton & Cukier, 2006, p. 254) has become common. This behaviour brings potential negative consequences on: (1) the individual using the technology (herein referred to as the "*user*"), who may become distracted and his or her performance in the meeting may be weakened (Jarvenpaa, Lang, & Tuunainen, 2005); (2) other individuals surrounding the *user* (herein referred to as "*second hand users"*), who may perceive this as an impolite behaviour, and that the *user* is placing more importance on his or her own affairs than the topic addressed in the meeting (Middleton & Cukier, 2006); and (3) if the *user* is stressed because of his or her excessive interaction mobile devices, this can affect the stress levels of *second hand users*, a phenomenon known as crossover of stress (Westman & Etzion, 1999). These negative consequences can be assessed as stressful by *second hand users*. Stress is defined as a situation assessed by a person as exceeding his or her resources, or affecting his or her well-being or goals (Lazarus & Folkman, 1984). When the *user* is affected (e.g. distracted, stressed), *second hand users* face a threat of potentially losing resources needed for the development of the meeting (e.g. the *user's* attention and performance). When *second hand users* are affected, they may become stressed and perceive harm has occurred (e.g. the *user* has offended them). The appraisals of threat and harm occur during stressful situations (Lazarus & Folkman, 1984). The stress created on *second hand users* can be considered as "second hand technostress". We define the term second hand technostress as the stress generated in an individual due to the distractive use of mobile devices by others in his or her vicinity. This type of technostress is expected to arise in particular in situations where individuals are interacting with each other, and especially where the situation demands the full attention from each of the participants (e.g. work meetings).

Studies in technostress have focused mainly on its negative consequences for technology *users* (e.g. individual productivity, job satisfaction, and organizational commitment), the sources of users' negative reactions to technologies, and the technology characteristics that can create stress (Ayyagari, Grover, & Purvis, 2011; Ragu-Nathan, Tarafdar, & Ragu-Nathan, 2008; Shu, Tu, & Wang, 2011). These studies are focused on technologies used by workers at their jobs (e.g. mobile technologies, application and enterprise computer technologies). No known research has focused on the 'second hand technostress' derived from the excessive and distractive usage of mobile devices by others.

The proposed research in progress paper attempts to fill this gap by trying to understand the factors that determine second hand technostress, due to the distractive use of mobile devices by others, in the context of organizational meetings. It is important to note that this study will focus on the distractive use of data communication with mobile devices (e.g. texting, browsing, and instant messaging) during work meetings. The use of data communication over voice communication is selected for two reasons.

First, there is a general trend of using more data services than voice services on smart devices. The use of voice services in mobile devices (i.e. phone calls) has stagnated, while data usage (e.g. text messages, emails) is increasing (Malik, 2012). For example in the U.S., the amount of data sent through mobile devices surpassed voice traffic for the first time in 2009 (Wortham, 2010). Second, voice usage generates a different type of interruption compared to that resulting from data communication: a meeting can proceed in spite of data interruptions, but it may not be able to continue with voice interruptions. Therefore, in order to focus the investigation and avoid potential confounding elements, this paper concentrates only on distractive data communications with mobile devices.

The remainder of this paper is organized as follows. Section 2 provides a review of the technostress literature. Section 3 provides the theory and research framework for this study. The research model is presented in Section 4, with a proposed methodology to validate it presented in Section 5. Finally, Section 6 identifies the potential contributions and limitations of this study.

2 Technostress Literature

The term technostress was coined by Brod (1984) and defined as "a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner" (Brod, 1984, p. 16). This phenomenon can be distinguished from computer anxiety, which involves a fear to use computers (Shu, Tu, & Wang, 2011). Technostress is focused on individuals' struggle to deal with the cognitive and social requirements derived from the use of technologies (Tarafdar M. , Tu, Ragu-Nathan, & Ragu-Nathan, 2007). Some of the symptoms associated with technostress include memory issues, sleep difficulties, headaches, irritability, gastrointestinal problems, frustration, irritation, annoyance, and withdrawal from technology (Brillhart, 2004; Al-Fudail & Mellar, 2008).

One of the aspects studied in technostress are the characteristics of the technology that may enhance the stressors experienced by individuals in the work environment, which in turn are associated with perceived strain. In particular, the ability to be reachable at any time or place and the rapid change of the technological environment are posited to increase workplace stressors (e.g. work overload) (Ayyagari, Grover, & Purvis, 2011). Besides technology characteristics, there are also two other aspects that can contribute to the creation of technostress: organizational environment, and individual differences. Individuals that work in organizations with high centralization of power and a culture highly focused on innovation tend to experience high levels of technostress (Wang, Shu, & Tu, 2008). Women, older workers, and individuals with formal education or computer confidence experience less technostress (Tarafdar M. , Tu, Ragu-Nathan, & Ragu-Nathan, 2011).

There are five technostress-creating conditions in the work environment (Tarafdar M. , Tu, Ragu-Nathan, & Ragu-Nathan, 2007). "Techno-overload" refers to situations where technologies force people to work more and faster. Mobile devices along with other technologies (e.g. collaborative applications) make it possible to process multiple sources of information and may lead to information overload, interruptions and multitasking (Tarafdar M. , Tu, Ragu-Nathan, & Ragu-Nathan, 2011). "Techno-invasion" refers to the expected availability of employees anytime, and the blurring between work and personal life boundaries. "Techno-complexity" refers to the *users'* lack of skills to work with the technology, which make them spend time and effort in learning and understanding the technology. "Techno-insecurity" refers to the threat represented by technology to workers, in the sense that they may be replaced by technology. Finally, "Techno-uncertainty" refers to constantly changing technologies that create uncertainty for *users* and require them to continually learn how to use new technologies (Tarafdar M. , Tu, Ragu-Nathan, & Ragu-Nathan, 2007).

Technostress can have several effects in organizations (Tarafdar et al., 2011) such as: (1) exacerbation of role overload, which refers to the perception of excessive or highly difficult work; (2) increased role conflict, which occurs when individuals face contradictory requirements from their job; (3) decreased innovation in tasks while using ICTs; (4) reduced satisfaction with the ICTs used; and (5) reduced job satisfaction, productivity, and organizational commitment. The effects of technostress can be reduced by using several organizational mechanisms such as (i) organizational and technical support for end users, (ii) involving users during system planning and implementation, and (iii) communication of changes and benefits that will result from the introduction of new ICTs. These mechanisms help *users*

become more familiar with the ICTs, as well as to overcome the fear or anxiety they may experience in their first interactions with the ICTs (Ragu-Nathan, Tarafdar, & Ragu-Nathan, 2008).

This review highlights the fact that Information Systems (IS) researchers have focused on the effects of using ICTs for *users* and how technostress can affect *users'* performance in the organization, without analyzing the potential negative consequences on individuals in *users'* vicinity (e.g. second hand technostress).

3 Theory and research framework

The development of context specific theory is deemed as an important frontier to advance IS research (Orlikowski & Iacono, 2001; Venkatesh & Bala, 2008). Thus, one of the first steps that can be taken in order to understand the second hand technostress phenomenon is to comprehend the factors that are specific to the context where the distractive use of mobile devices takes place and how they generate stress in others in the *user's* vicinity. In order to identify these factors, several theories and streams of literature were used. The literature utilized in developing a research framework for this study is briefly summarized in this section. The first theory used in this study was Social Impact Theory. According to this theory, individuals' actions influence others' feelings, thoughts, or behaviour (Latané, 1981). One of the factors that increase this impact is immediacy, which refers to the psychological or physical distance between the individuals (e.g. a closer physical distance results in a larger impact) (Sedikides & Jackson, 1990). In light of this theory, we selected organizational meetings as a social context where the impact of individuals' actions on those around them could be examined. Meetings serve an important function in organizational communication, and individuals are in close proximity during physical meetings. Meetings involve employees from all levels of the organization and have become more complex due to the availability of ICT to use for meeting and non-meeting purposes (Stephens & Davis, 2009).

Within this context, we explored the potential antecedents of second hand technostress. In order to identify these potential factors, we conducted a literature review in four areas: (1) technostress literature that, as discussed before, has addressed the conditions in the workplace that create technostress and the effects of technostress in organizations. (2) Literature on interruptions, which has explored the characteristics of interruptions (e.g. frequency, complexity), their effect on task performance (e.g. decision making performance), and strategies for managing ICT-mediated interruptions (e.g. turning off mobile phone) (see for example Gillie & Broadbent, 1989; Rennecker & Godwin, 2005; Speier, Valacich, & Vessey, 1999). (3) Social Exchange Theory, which views social exchanges (i.e. interpersonal interactions that do not involve an economic exchange) as rational processes where individuals perform cost-benefit analyses and engage in the exchange only if they can obtain rewards (e.g. ideas, affection) that exceed the costs they incur (Homans, 1961). Finally, (4) the literature on multicommunication (i.e. "communication practices involving technology where people conduct multiple, nearly simultaneous conversations"; Stephens, 2012, p. 195) and multitasking was reviewed. This literature has explored the antecedents of multicommunication (e.g. perceived effectiveness of multicommunication in different tasks) and multitasking (e.g. observation of organizational norms), the losses and gains related to work tasks (e.g. confusion, errors, and use of information from one conversation in another), and the relational outcomes of multicommunication (e.g. perceived incivility, and interpersonal trust) (see for example Cameron & Webster, 2011; Cameron & Webster, 2012; Reinsch, Turner, & Tinsley, 2008; Stephens & Davis, 2009).

After identifying the potential antecedents of second hand technostress, we grouped them in major categories. The initial set of categories was taken from Brown, Dennis, and Venkatesh (2010), who classified the factors that affect workgroup outcomes into four major categories: individual and group, technology, task, and situational. We then mapped those categories to the context of second hand technostress: (1) individual and group characteristics were mapped to the characteristics of both the individual using the mobile devices in a distractive manner (i.e. *user*) and the individuals experiencing second hand technostress (i.e. *second hand users*); (2) technology factors were mapped to mobile interruption characteristics; (3) task factors were mapped to meeting characteristics; and (4) situational factors were mapped to organizational factors. The outcome of this process is the research framework

presented below in Figure 1. It is important to note that although there may be several individuals attending a work meeting, this research framework focuses on the *user* and the *second hand user*.

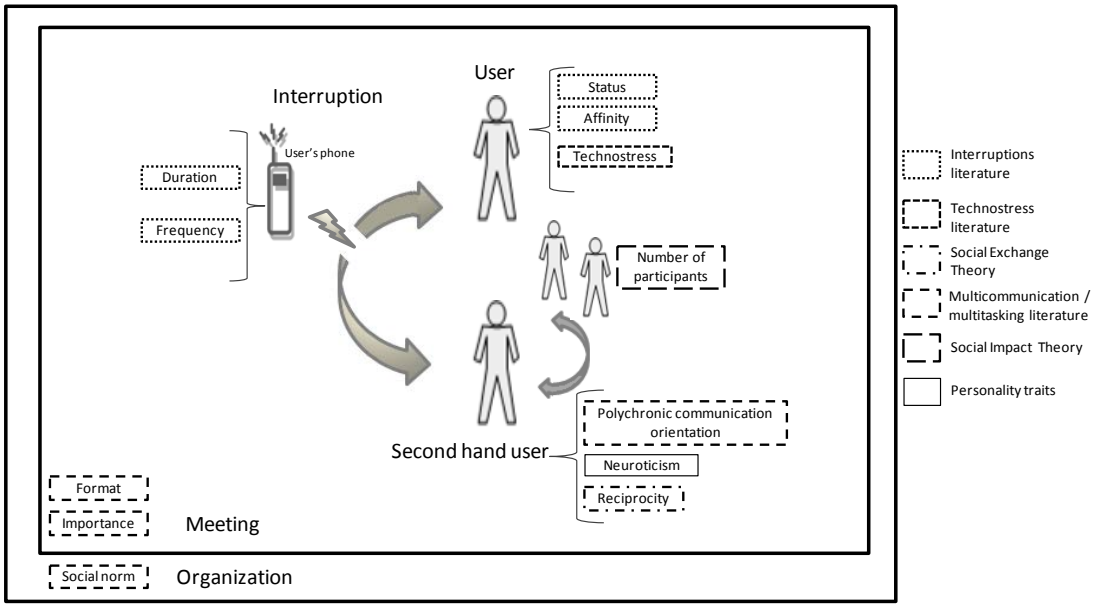

Figure 1. Research framework

4 Proposed research model

The research framework presented in Figure 1 laid the foundations for the theoretical constructs to be used in the research model proposed in this study. Each theory and stream of literature consulted support constructs in the different categories identified in the framework: (1) the multicommunication/multitasking literature supports characteristics of the meeting (i.e. format and importance), the organization (i.e. social norms), and the *second hand user* (i.e. polychromic communication orientation); (2) the interruptions literature supports characteristics of the *user* (i.e. status and affinity) and the interruptions (i.e. duration and frequency); (3) the technostress literature supports a characteristic of the *user* (i.e. technostress); (4) Social Impact Theory supports a characteristic of the meeting (i.e. number of participants); and (5) Social Exchange Theory supports a characteristic of the *second hand user* (i.e. reciprocity). These constructs are included in the research model presented in Figure 2. The constructs and support for the relationships defined in the model are described below.

4.1 Second hand technostress

As defined earlier, second hand technostress may be generated in an individual due to the distractive use of mobile devices by others in his or her vicinity. The impact of the distractive use of mobile devices on individuals' vicinity (e.g. work meeting) is akin to what occurs with smoking. With smoking, there can be negative consequences not only for the smoker but also for those present when he or she is smoking (known as a second hand smoke). The distractive use of mobile devices can affect the person using the mobile devices (i.e. the *user*) and those in his or her vicinity (i.e. the *second hand users*). The distractive use of mobile devices during work meetings may lead to *second hand users'* experiencing stress (i.e. second hand technostress). Past literature suggests that workplace stressors, such as technostress, lead to emotional responses, thereby impacting attitudes (e.g. commitment) and behaviours (Rodell & Judge, 2009).

The concept of technostress covers user's negative cognitions about ICTs, which include frustration derived from ICT-mediated interruptions (Tarafdar, Tu, & Ragu-Nathan, 2011). In the case of second hand technostress, the task disruptions will be suffered by *second hand users*; the progress of the

meetings will be affected by the reduction in attention and effort from the *user*, leading *second hand users* to experiencing second hand technostress.

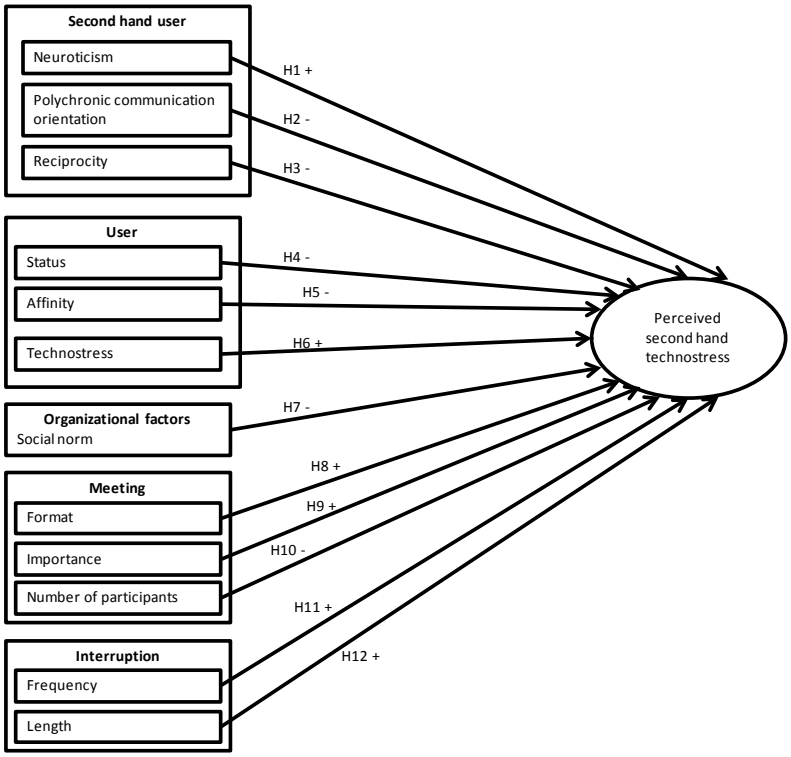

Figure 2. Research model

4.2 Second hand user characteristics

Neuroticism: Neuroticism, or emotional instability, refers to a personality trait characterized by insecurity, anxiousness, and hostility (Devaraj, Easly, & Crant, 2008). Neuroticism is associated with an increased likelihood of experiencing negative emotions (e.g. anxiety, depression), with subjective reports of stress symptoms, and with the occurrence of stressful life events (Magnus, Diener, Fujita, & Pavot, 1993). Individuals high in neuroticism tend to appraise ambiguous situations in a negative manner (Boyes & French, 2010). Moreover, neurotic individuals are more likely to focus cognitive processing on stressful information (Osorio, Cohen, Escobar, Salkowski-Bartlett, & Compton, 2003). If an individual high in neuroticism finds him or her in a situation where others are using distractively their mobile devices, he or she is more likely to appraise the situation negatively and to experience more second hand technostress.

H1: Neuroticism of *second hand users* is positively related to their perceived second hand technostress

Polychronic Communication Orientation (PCO): Polichronicity can be defined as "the extent to which people prefer to engage in multiple tasks simultaneously" (Palmer & Schoorman, 1999, p. 324). PCO refers to individuals' preference to engage in multiple communications at the same time and to consider it as an acceptable behaviour (Cameron & Webster, 2011). It is expected that when a *second hand user* has a higher PCO, he or she will consider it acceptable that others use their mobile devices distractively. Conversely, a *second hand user* with a low PCO may expect others to give their full attention to the conversation that is taking place (i.e. work meeting) and any violation of this (e.g. distractive use of mobile devices) may be perceived as disrespectful and rude (Cameron & Webster, 2011). Moreover, *second hand users* with a low PCO may perceive that the performance of the *user* will be weakened. Thus, *second hand users* with high PCO are expected to experience less second hand technostress.

H2: PCO of *second hand users* is negatively related to their perceived second hand technostress

Perceived reciprocity: Although the concept of reciprocity has not been strictly defined by researchers, it can be viewed as a norm, where any action provided by an individual to another has some utility and it is expected to be returned; this expectation regarding the exchange entails some agreed-upon standard of equivalence (Gouldner, 1960). For example, the influence of reciprocity may lead individuals to give personal information to strangers, or disclose feelings to their partners (Wahrendorf, Ribert, Zins, Goldberg, & Siegrist, 2010). According to Social Exchange Theory, individuals only engage in social interactions if the perceived rewards are higher than the perceived costs. However, the individuals will only find out the extent to which they will obtain the rewards while the interaction is occurring. If they are giving more than what they are receiving, they are expected to experience feelings of unfairness, resentment, and burden (Bowling, Beehr, & Swader, 2005). In situations where *second hand users* are interacting with a *user* engaged distractively with a mobile device (e.g. during a meeting), they will perceive that they are giving more of a social exchange favour (i.e. attention) than receiving it. Moreover, *second hand users* may perceive they have lost access to resources they need (e.g. *user*'s attention, effort, and ideas). In the interruption literature, the unpredictable loss of access to needed resources is posited to correspond with stress (Rennecker & Godwin, 2005). Therefore, it is expected that when *second hand users* perceive high reciprocity in terms of having more attention from *users* in meetings (i.e. *users* refraining/reducing their use of mobile devices distractively), they may experience less second hand technostress.

H3: Perceived reciprocity by *second hand users* is negatively related to their perceived second hand technostress

4.3 User characteristics

Status: In communications, people typically defer control to individuals of higher status (e.g. supervisors) (Goffman, 1959). High status individuals often receive more attention and have more influence on others than low status individuals (Berger, Cohen, & Zelditch, 1972). If the *user* has a higher status relative to the *second hand users*, then it is likely that they will accept the *user's* distractive use of mobile devices. For example, Kleinman (2007) found that individuals would accept mobile device use during meetings by others considered to be of higher rank (e.g. clients, managers). On the other hand, they would complain if those using the mobile device were considered to be of lower rank in the organization (e.g. subordinates). In light of these findings, it is expected that *second hand users* may experience more second hand technostress when the *user* has lower status than they have.

H4: *User* status is negatively related to perceived second hand technostress in *second hand users*

Affinity: Affinity can be understood as a driving force that makes a person seek a relationship with another person, based on the latter's attributes (Oberecker, Riefler, & Diamantopoulos, 2008). Affinity can vary among co-workers (e.g. they can consider some as friends) and it may influence how responsive an individual is to others' needs (Rennecker & Godwin, 2005). Moreover, past research suggests that affect may influence individuals' performance evaluation (Robins & DeNisi, 1994). A person evaluating others may hold on to his or her beliefs about them in an effort to preserve the relationship with them (Kingstrom & Mainstone, 1985). It is expected that *second hand users* may evaluate more favourably the behaviour of distractive use of mobile devices if they have high affinity for the *user* (e.g. she or he is a friend). In this case, it is expected that the *second hand user* may not experience as much second hand technostress. Thus, we hypothesize that:

H5: *Second hand user*s' affinity towards the *user* is negatively related to their perceived second hand technostress

Technostress: The individual using the mobile devices distractively can also experience stress. When the *user* receives emails or messages on his or her mobile device during the meeting, he or she does not have control over the timing and nature of these interrupting messages (Cameron & Webster, 2012). This perceived lack of control is associated with stress and decreased performance (Dollar, Winefield, Winefield, & de Jonge, 2000). The stress experienced by an individual at work may cross over to other individuals with whom he or she interacts (e.g. spouse, co-workers), a phenomenon known as crossover of stress (Westman & Etzion, 1999). Therefore, it is expected that crossover of

stress may occur with the distractive use of mobile devices during meetings: the technostress the *user* perceives may lead to more stress being experienced by the *second hand user* (i.e. second hand technostress). Thus, we hypothesize that:

H6: Technostress of the *user* is positively related to *second hand users'* perceived second hand technostress

4.4 Organizational factors

Social Norm: Individuals often use social norms to understand a social situation and to determine how to respond effectively to it (Cialdini & Goldstein, 2004). Organizational cultures that emphasize constant availability make individuals feel pressure to reply to text messages, emails, or take phone calls, even if they are already engaged in a meeting (Cameron & Webster, 2012). When the organization encourages or allows this behaviour (i.e. use mobile devices in meetings), individuals accept it as a norm (Reinsch, Turner, & Tinsley, 2008). It is expected that when the use of mobile devices during meetings is an accepted social norm within an organization, *second hand users* may not experience as much second hand technostress.

H7: A perceived social norm of accepted mobile device distractive use during meetings is negatively related to perceived second hand technostress in *second hand users*.

4.5 Meeting characteristics

Format: The information flow in a meeting can lead to two main meeting formats. In a hierarchical format, the information passes mainly between an individual and all other participants (e.g. presentation meetings, announcement meetings). On the other hand, in an organic format, most of the participants send and receive information (e.g. brainstorming, problem-solving meetings) (Volkema & Niederman, 1996). The format of a meeting can affect individuals' decision to use their mobile devices during meetings and their reaction to this behaviour. During hierarchical meetings, individuals may perceive that less attention is required from them, and they may deem as appropriate to use mobile devices (Cameron & Webster, 2012). In the case of an organic meeting, where active participation and attention is expected from all members, these resources can be lost due to the distractive use of mobile devices. As mentioned before, this unexpected loss of access to needed resources may be associated with stress (Rennecker & Godwin, 2005). In light of these arguments, it is expected that participants in an organic meeting will experience more second hand technostress as a result of a *user's* distractive use of mobile devices than participants in a hierarchical meeting.

H8: Meetings that are more organic in nature will result in *second hand users* experiencing higher levels of second hand technostress

Importance: The importance of the topic(s) discussed in a meeting may influence the behaviour of its participants. In the case of a meeting that is not deemed very important by the participants, they may prefer to engage in other activities (e.g. use of mobile devices) in order to "alleviate boredom and get work done at the same time" (Kleinman, 2007, p. 2503). In the case of an important meeting, it can be argued that individuals would not use their mobile devices and would be bothered by others' using them (Nickerson, Isaac, & Mak, 2008). Thus, it is expected that when a meeting is deemed important, *second hand users* may experience more second hand technostress as a result of the distractive use of mobile devices by the *user*.

H9: The importance of the meeting is positively related to perceived second hand technostress in *second hand users*

Number of participants: According to Social Impact Theory, the impact of a person's behaviour on others is reduced when the number of people being impacted increases (Latané, 1981). In the case of a meeting, the presence of individuals besides the *user* and the *second hand user* may reduce the impact of the distractive use of mobile devices by the *user* on the *second hand user*. With other participants in the meeting, the *second hand user* can still interact with them and obtain their full attention despite the *user's* distraction. Thus, it is expected that when there are several participants in a meeting, *second*

hand users may experience less second hand technostress as a result of the distractive use of mobile devices by the *user*.

H10: The number of participants in a meeting is negatively related to perceived second hand technostress in *second hand users*

4.6 Interruption characteristics

Frequency: Interruptions can be defined as discrete and externally generated events that break the continuity of focus on a primary task, usually requiring immediate attention and prompting action (Speier, Valacich, & Vessey, 1999). As mentioned before, the distractive use of mobile devices during work meetings can be considered interruptions that will affect *user's* attention and the overall progress of meetings. One of the characteristics of interruptions that could have an impact on *user's* performance in meetings is the frequency of interruptions. Frequent interruptions increase the number of information cues the *user* has to process, reducing his or her attention on a task (i.e. the meeting). This can result in an increased likelihood of errors and time the *user* needs to reprocess information relevant to the meeting (i.e. recovery period) (Speier, Valacich, & Vessey, 1999). The delay of a *user* in resuming his or her tasks during the meeting may lead to stress for other meeting participants (Rennecker & Godwin, 2005). Therefore, it is expected that frequent interruptions may increase the chances of *second hand users'* experiencing more second hand technostress.

H11: The frequency of interruptions is positively related to perceived second hand technostress in *second hand users*

Length: The length of an interruption can also affect the *user*'s attention and focus on the goals and tasks of a meeting. Monk, Trafton, and Boehm-Davis (2008) found that longer interruptions lead to longer delays in resuming a primary task or goal following the interruption. The delay of the *user* in resuming his or her tasks in the meeting following an interruption may result in a decrease of his or her performance which, as mentioned before, may result in stress for the other participants in the meeting. Moreover, the uncertainty around the total duration of the interruption also induces stress for individuals (Monat, Averill, & Lazarus, 1972). In light of these arguments, it is expected that longer interruptions may make *second hand users* experience more second hand technostress.

H12: The length of interruptions is positively related to perceived second hand technostress in *second hand users*

5 Methodology

A future qualitative study will be performed to refine the theoretical model presented in this paper. In particular, a focus group approach will be used in order to identify critical components that need to be added to the model. The participants' intervention in the discussions will be analyzed using content analysis techniques (e.g. meaning condensation and categorization), in order to reduce the content of the sessions into common themes and meaningful categories (Bachiochi & Weiner, 2004).

The refined theoretical model will be validated with a survey-based quantitative study. Participants in the study will be adults who took part in at least one work meeting within the past two months, where someone used her or his mobile device in a distractive manner. This time period has been used by other researchers to collect data about situations experienced in the past (e.g. Beaudry and Pinsonneault, 2010). Structural Equation Modelling (SEM) will be used to validate the refined research model. In particular, Partial Least Squares (PLS) will be used as it is suitable for exploratory studies (Gefen, Straub, & Boudreau, 2000) like the one proposed. The minimum sample size required for the quantitative study will be determined by following Gefen, Straub, and Boudreau's (2000) guideline for PLS: the minimum sample size should be the larger of (i) ten times the number of items for the most complex construct in the model or (ii) ten times the largest number of independent variables impacting a dependant variable in the model.

In the quantitative study, the construct second hand technostress will also be developed and validated following the methodology proposed by Lewis, Templeton, & Byrd (2005). In brief, this methodology

involves three sequential stages. The first stage is domain establishment, where the definition of second hand technostress will be developed and its dimensions will be proposed through a literature review and content analysis in the areas of psychology and IS. The second stage is instrument construction, where the scale will be refined via a pre-test (with experts such as IS faculty members), a pilot test (with participants drawn from target population), and item screening (with researchers from IS and psychology). The third stage is the evaluation of measurement properties, where the proposed second hand technostress construct will be administered to conduct an exploratory and a confirmatory factor analyses. In addition, the construct will be tested in an established nomological network to obtain further evidence of the appropriateness of the scale (Lewis, Templeton, & Byrd, 2005).

6 Potential contributions and limitations

From an academic standpoint and to the best of our knowledge, this is the first study to address the phenomenon of second hand technostress. Although there have been important advances in studying technostress produced by the frequent use of ICTs in the workplace, less is known about how this frequent usage can affect individuals surrounding the "heavy users" of ICTs. In particular, the construct second hand technostress will be developed and validated as a first step in measuring the stress aroused in individuals when others in their surroundings are using mobile devices distractively. In addition, the study will provide theoretical insights into the factors specific to work meetings context that can impact individuals' second hand technostress.

From a practical perspective, identifying the factors that influence the levels of second hand technostress experienced by *second hand users* in meetings can help organizations to design interventions aimed at reducing the occurrence of second hand technostress. For example, perceived reciprocity can be used by managers to help set expectations at the beginning of meetings. If individuals are made aware of the expectations from others regarding non-usage of their mobile devices during the meeting, it is likely that individuals will refrain from using them. This in turn, may reduce the posterior occurrence of second hand technostress.

This study has generalizability limitations. The conditions that lead to second hand technostress in a work meeting may not correspond to the ones present in family gatherings, friends meetings, or classrooms. These contexts should be studied in future research endeavours.

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